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REVISED FINAL REPORT K-65 DECANT SUMP REMOVAL ACTION FEBRUARY 1993

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REPORT

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K-65

DECANT SUMP TANK REMOVAL ACTION

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FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

REVISED FINAL REPORT

K-65 DECANT SUMP TANK REMOVAL ACTION

FEBRUARY 1993

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ATTACHMENTS

ACRONYMS

AEA	Atomic Energy Act
ALARA	As Low As Reasonably Achievable
ARARs	Applicable, Relevant and Appropriate Requirements
BMP	Best Management Practices
CATEX	categorical exclusion
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DOE	Department of Energy
DOE-FN	Department of Energy-Fernald Office
DOE-HQ	Department of Energy-Headquarters
ETS	Effluent Treatment System
FEMP	Fernald Environmental Management Project
FFCA	Federal Facilities Compliance Agreement
FMPC	Feed Materials Production Center
FR	Federal Register
HEPA	High Efficiency Particulate Air
NCP	National Oil and Hazardous Substances Contingency Plan
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
OEPA	Ohio Environmental Protection Agency
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PACD	Proposed Amended Consent Decree
RAWP	Removal Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
RSE	Removal Site Evaluation
RWP	Radiation Work Permit
WEMCO	Westinghouse Environmental Management Company of Ohio
USC	United States Code
U.S. EPA	United States Environmental Protection Agency

EXECUTIVE SUMMARY

One of the Remedial Investigation/Feasibility Study (RI/FS) identified operable units, Operable Unit 4 (OU4), at the Fernald Environmental Management Project (FEMP) includes the two K-65 Silos (Silos 1 and 2), the metal oxide silo (Silo 3), Silo 4, the K-65 decant sump tank system, and the potentially contaminated soils surrounding the waste storage silos. A Removal Site Evaluation (RSE) was generated by the Department of Energy (DOE) consistent with 40 CFR 300.410. It was determined by the DOE-Fernald Office (DOE-FN), as the lead agency at the FEMP, that a removal action was necessary to remove liquid from the K-65 decant sump tank. This removal action was conducted pursuant to the Consent Agreement under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 120 and 106(a) between the DOE and the United States Environmental Protection Agency (U.S. EPA).

The K-65 Decant Sump Tank Removal Action was implemented to protect human health and the environment from a potential release of the liquid within the decant sump to the surrounding subsoils. Pumping was initiated on March 26, 1991, and was completed on April 16, 1991, ten (10) days ahead of schedule. During this period, approximately 10,000 gallons of sump liquid were removed from the decant sump tank and access piping. Prior to treatment at the FEMP wastewater treatment facilities, samples of the liquid were taken and analyzed in accordance to FEMP hazardous waste management and control practices. On evaluation of the analytical results, it was determined that the liquid could be treated using approved treatment procedures for heavy metals and radionuclides at the existing FEMP wastewater treatment facilities. Treatment was completed on May 12, 1992. After treatment, the wastewater was discharged through a National Pollutant Discharge Elimination System (NPDES) monitoring point.

Rainwater infiltration into the decant sump system is expected to occur slowly over time. Therefore, post-removal action monitoring of the liquid level is required, as a best management practice action, until final remediation is initiated. Future removal of the liquid in the K-65 decant sump tank may be required based on the monitoring results.

OVERVIEW

The K-65 Silos are large concrete structures built in 1951 and 1952 which contain the residues from pitchblende ore processing operations at the Fernald Environmental Management Project, formally known as the Feed Materials Production Center (FMPC), and at St. Louis (Mallinckrodt Chemical Works). These residues contain radium, uranium, and thorium (Th-230). Beneath each silo, an underdrain system, which was designed to discharge into a sump tank, was constructed to collect drainage from the surrounding subsoils and any potential leakage through the concrete and clay base on which Silos 1 and 2 were constructed.

The silos were designed with a decant system which also discharged into the sump tank. The silos were filled by a process that consisted of pumping a slurry, settling of the solids, and decanting of the liquid, which was recycled. The decant system was designed to remove the liquid portion of the K-65 slurry after the solids had settled. Since this liquid was withdrawn in conjunction with the process of filling the silos, it was used on a daily basis during the years the silos were filled. As the primary purpose of the sump tank was to receive the liquid, it was called the decant sump tank. The decant tank has a 9,000-gallon design capacity.

Earthen berms were placed around the silos in 1964 to provide structural support to the silos. Berm construction was done in two phases. Due to the steep slope of the first berm, slumping occurred. A second berm was placed over the first to stabilize the berm slope. At this time, the decant system was disconnected from the decant sump tank since the silos were no longer being filled, but the underdrain system remained intact. The purpose was to continue to have the capability of collecting any drainage to the underdrain system.

Prior to the completion of the earthen berm addition, a 30-inch diameter corrugated, galvanized steel pipe was attached to the decant sump tank manway to provide access to the decant sump tank. This pipe was designed to extend upward 33 feet to the top of the berm. As a result of the slumping of the first berm, the access pipe shifted and bent. Although this pipe provided access to the decant sump tank, no information exists to indicate that the level of the liquid in the decant sump tank was monitored prior to August 1989.

In August 1989, a monthly sampling program was initiated at the request of the U.S. EPA. As a result of this sampling activity, high concentrations of radionuclides were observed in the decant sump tank liquid. The contaminants found in the decant sump tank were similar to those found in the K-65 Silo residue. These results supported the belief that the tank had not been cleaned of residues when the decant system was disconnected and the silo berms were constructed. The data from this sampling program was used to support the preparation of the RSE.

Concerned about a potential release and subsoil contamination, an RSE was prepared to support DOE-FN in the determination of the need for the removal of this liquid from the decant sump tank. In response to the RSE, DOE-FN issued an Action Memorandum to the operating contractor to implement a removal action.

A Removal Action Work Plan (RAWP) was prepared in accordance with the Consent Agreement. The Consent Agreement requires that a work plan be submitted to the U.S. EPA for review and approval prior to the implementation of all removal actions. The U.S. EPA conditionally approved the submitted RAWP on January 10, 1991.

Results from the October 1990 preliminary (pre-removal action) sampling of the decant sump tank liquid (this sampling effort is separate from the monthly sampling program initiated in August, 1989) were evaluated prior to the initiation of the removal action. The preliminary analyses results (Attachment A) indicated that the trace volatile organic compounds detected were below regulatory concern, however, measurable concentrations of some heavy metals and radionuclides were observed. Throughout the removal action, management and control of the potentially hazardous liquid was performed according to all applicable, relevant and appropriate requirements (ARARs) identified for this removal action, in conjunction with FEMP hazardous waste management practices.

The constituents that were observed in the decant sump tank are defined as "by-product" material and therefore are excluded from Resource Conservation and Recovery Act (RCRA) regulations under 40 CFR 261.4(a)(4). The pitchblende ore contained heavy metal impurities that were native to the different regions (i.e. the Belgian Congo, Australia) that supplied the ore to the FEMP. When processed, these impurities were liberated from the rock matrix of the uranium ore. These naturally occurring heavy metal compounds, containing arsenic, cadmium, chromium, lead, selenium, and silver, were removed from the process material and collected as a constituent of the slurried residue. The process residues that were in the decant sump tank contained these liberated process impurities.

During the implementation phase of the removal action, approximately 10,000 gallons of sump liquid were removed from the decant sump tank and access piping and ultimately transferred to the FEMP wastewater treatment facilities for treatment. In order to determine the proper disposition of the material, samples for final analyses of the pumped liquid were required to be taken. The pumped liquid was handled, stored in Plant 2/3 Refinery Tank F3E-408, and monitored, in accordance with hazardous waste management procedures. Final analyses (Attachment B) of the pumped liquid from the decant sump tank yielded results which showed that all volatile organics and semi-volatile organic compounds were below concentrations of regulatory concern, however, a number of heavy metals were present, as "by-product" residue impurities, in levels exceeding the regulatory limits.

Meeting the FEMP wastewater pre-treatment standards (e.g. volatile organic or semi-volatile organic constituents at levels below regulatory concern), the liquid was treated in the existing FEMP wastewater treatment facilities using approved treatment procedures for heavy metals and radionuclides. After treatment, the wastewater was discharged through an NPDES monitoring point. This treatment was completed on May 12, 1992.

As a follow-up to the removal action, the level of the liquid in the decant sump tank has been measured on a routine basis to observe the expected rainwater infiltration into the decant sump tank system. Approximately one (1) year after the completion of the removal action, the liquid

level in the decant sump tank had risen approximately three (3) feet. This corresponds to approximately 3,000 gallons of liquid and sludge. These results were expected as the underdrain system is still intact. The monitoring of the decant sump tank liquid will continue until final remediation.

The point at which further pumping of the liquid in the decant sump tank should be initiated to prevent potential release of the liquid into the environment has been estimated, using best engineering judgement, to be in the order of 75 to 80% of the 9,000-gallon tank capacity.

In December 1992, the level in the tank was calculated to be within the 70 to 80% target range. A planned maintenance operation was implemented to remove the liquid in the decant sump tank in accordance with the procedures outlined in the K-65 Decant Sump Tank RAWP.

REMOVAL ACTION IMPLEMENTATION

In 1964, the decant portion of the system was disconnected in conjunction with the placement of the earthen berms around the silos, but the underdrain system was left intact. This underdrain system was designed to collect potential leakage from the K-65 Silos or drainage from rainwater and groundwater infiltration. The collected liquid from the underdrain system is delivered to the decant sump tank via underground pipe. Also at this time, access was provided to the decant sump tank by attaching a 30-inch diameter corrugated galvanized steel pipe to the manway of the decant sump tank. The pipe extends 33 feet upward to the top of the berm. This access pipe was bent by slumping of the earthen berm from 1964 and therefore currently provides only limited access for monitoring.

During the routine monthly sampling of the decant sump tank (initiated in August of 1989), standing water was observed inside the corrugated galvanized steel pipe, approximately 25 feet above the decant sump tank. Concerned about a potential release and subsoil contamination, the DOE-FN initiated an RSE.

Consistent with Section 300.415 of the National Oil and Hazardous Substances Contingency Plan (NCP), two factors were presented in the RSE for DOE-FN to consider in determining the appropriateness of such a removal action.

1) Actual or potential contamination of drinking water supplies or sensitive ecosystems.

2) Hazardous substances, pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release.

On completion of their review of the RSE, DOE-FN as the lead agency, determined that the removal of liquid from the K-65 decant sump tank was an appropriate time-critical removal action which followed the guidelines of the NCP. On August 24, 1990, DOE-FN issued an Action Memorandum which directed that a RAWP be prepared in accordance with the Consent Agreement. The Consent Agreement requires that a work plan be submitted to the U.S. EPA for review and approval prior to the implementation of each removal action. The U.S. EPA conditionally approved the DOE-FN submitted RAWP on January 10, 1991.

The scope of the K-65 Decant Sump Tank Removal Action consisted of removing the liquid from the K-65 decant sump tank, dispositioning the removed liquid, and treating of the liquid at the existing FEMP wastewater treatment facility. Management and control of the liquid was in accordance with the FEMP radiological and hazardous waste management practices.

The work plan identified the support activities which included the planning activities, the additional data/studies, the design activities, and the training requirements that were necessary to perform the removal action. Field actions were outlined to direct the implementation of the removal action and the treatment process.

During the implementation phase of the removal action, approximately 10,000 gallons of sump liquid, taken from the decant sump tank and access piping by a submersible pump, was collected by a tank-trailer and transported to the FEMP wastewater treatment facilities for eventual treatment. Multiple trips to the treatment facility were required to be taken by the 5000-gallon capacity tank-trailer. A representative sample of the liquid for each load of liquid transferred was taken from the tank-trailer to analytically test for organics, heavy metals and radionuclides prior to wastewater treatment. Approximately 300 gallons of residue sludge, which originated from the original decant operations, is estimated to remain in the decant sump tank itself.

The results of both the pre- and post-removal action analyses yielded trace volatile and semi-volatile organic compounds at levels below regulatory concern. Measurable concentrations of the radionuclides isotopes uranium, radium, thorium, and lead were observed in the samples. These are the same radionuclide constituents that exist in the residues that are contained in the K-65 Silos. Detailed information on the analysis results is included in the Sampling and Analysis section.

FEMP pre-wastewater treatment does not allow volatile or semi-volatile organics to be present at levels above regulatory concern in FEMP wastewater prior to treatment in the wastewater treatment facility. Since volatile and semi-volatile organics were present at levels below regulatory concern, as seen by the results of the post-removal action analyses, wastewater treatment for radionuclides and heavy metals was allowed. The treatment process for radionuclides and heavy metals in the wastewater treatment facility was largely determined by the presence and content of Thorium in the wastewater to be treated (refer to Section IV, 2.0, page 6 of the RAWP).

The pumped liquid that was stored in Plant 2/3 Refinery Tank F3E-408 was neutralized and transferred by pipeline to the Plant 8 wastewater treatment facility. Solids were removed from the wastewater by filtration. The filtrate was pumped to the General Sump and segregated for nitrate treatment. The filtrate was then pumped to the Biodenitrification Surge Lagoon where additional solids removal by settling occurred. The filtrate was then pumped into the Biodenitrification Bioreactors for nitrate reduction.

Meeting the FEMP wastewater discharge standards, the filtrate was discharged to the Effluent Treatment System (ETS) for Biological Oxygen Demand and Total Suspended Solids control. It should be noted that the wastewater treatment for radionuclide removal is effective for all types of radionuclides, including the minute amount of Radium-226 detected by the pre-treatment, post-removal action sampling and analyses. The treated filtrate was then discharged from the ETS through a NPDES monitoring point, which is monitored routinely.

SAMPLING AND ANALYSIS

Starting in August 1989, the liquid in the corrugated pipe above the decant sump tank was sampled and analyzed by FEMP personnel for radionuclides in order to support the development of the RSE. In addition, preliminary (pre-removal action) sampling and analyses were conducted in October 1990 to support the health and safety controls in the RAWP. The preliminary sampling analyses results are included as Attachment A. During the removal action (post-removal action), a representative sample from each load was taken from the tank-trailer prior to transferring it to Plant 2/3, where the liquid was stored in the Refinery Tank F3E-408. The sampling analyses results for each of the representative samples are included in Attachment B. The pumped liquid remained in storage until the sampling analyses results became available. An independent laboratory was used to support this phase of the work.

A comparative analyses of the pre-removal action, post-removal action, as well as the analytical results from the K-65 materials themselves are shown in Table 1. Comparative analyses of results of these waste streams can be used for identification of material origin. As is evident in Table 1, results from the pre-removal action sampling analyses (Attachment A) and the post-removal action sampling analyses (Attachment B) show that the radionuclide and heavy metal constituents in the liquid are similar to those seen in the K-65 residue. Furthermore, comparison of the results from the analyses of decant sump tank sludge (denoted by an "*" on Table 1) to the results of analyses of the K-65 residue (solid) shows that the decant sump tank sludge contains the same radionuclide constituents at concentration levels within the range observed for the constituents in the K-65 residue.

The preliminary pre-removal data was included solely for background information only. It was used as a basis for determining the health and safety requirements for handling the decant sump tank liquid. It should be noted that using these data for comparison is not relevant due to the fact that the pre-removal data were not validated by the laboratory that performed the analysis.

The types of radionuclides found in the decant sump tank were similar to those found in the K-65 residue. The maximum concentrations of the primary radionuclides of concern, as determined by sampling analysis, are: U-238 (26,000 pCi/L), U-234 (139 pCi/L), Ra-226 (1,200 pCi/L), Th-230 (< 1 pCi), and Pb-210 (8,000 pCi/L). Consistent with the State of Ohio Proposed Amended Consent Decree (PACD), process residues found in the decant sump tank are by definition "by-product" material and therefore are excluded from RCRA regulations under 40 CFR 261.4(a)(4).

As requested by the Ohio Environmental Protection Agency (OEPA), DOE-FN performed analyses on the decant sump tank liquid for the additional radionuclides: **actinium-227, protactinium-231, polonium-210 and lead-210**. Due to the timing of the request relative to the progress of the post-removal action lab work, only a limited analyses for the additional radionuclides were possible. The results are listed in Table 2.

TABLE 1

COMPARISON OF ANALYTICAL RESULTS

Constituent	Attachment A Decant Sump Tank (Liquid)	Attachment B Decant Sump Tank (Liquid/Sludge*)	Analysis of K-65 Silo Residue (Solid)
Total Uranium	57500 ug/l	77400 ug/l < 1255 ug/g*	137- < 18117 ug/g
Thorium 230	358 pCi/l	16 pCi/l 52130 pCi/g*	20500-160000 pCi/g
Radium 226	557 pCi/l	1640 pCi/l 128500 pCi/g*	657-890700 pCi/g
Arsenic	855 ug/l	720 ug/l	3.1-1960 mg/kg
Barium	683 ug/l	66 ug/l	89-22100 mg/kg
Cadmium	28 ug/l	14 ug/l	0.42-19.1 mg/kg
Chromium	417 ug/l	454 ug/l	12.9-165 mg/kg
Lead	39000 ug/l	627 ug/l	153-299000 mg/kg
Mercury	0.2 ug/l	0.2 ug/l	0.09-2.8 mg/kg
Selenium	5530 ug/l	7270 ug/l	0.32-2810 mg/kg
Silver	182 ug/l	230 ug/l	1.8-34.9 mg/kg

Note 1: (*) indicates the sample media was sludge.

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TABLE 2

ADDITIONAL RADIONUCLIDE ANALYTICAL RESULTS

Boring #	K-65 D	K-65 D
Sample #	099416	099417
Media Type	liquid	sludge
Units	pCi/l	pCi/g
Actinium-227	<91.1	5783
Protactinium-231	<431	<855
Polonium-120	7080	n/a
Lead-210	8660	123200

Sampling of both the wastewater during treatment, and the effluent discharged after treatment, was performed in accordance with the K-65 Decant Sump Tank Removal Action ARARs, FEMP policy and procedures, the FEMP Federal Facilities Compliance Agreement (FFCA), and the FEMP NPDES Permit. All regulatory limits for wastewater discharge were met.

HEALTH AND SAFETY PLAN

The task-specific Health and Safety Plan, which was prepared for implementation of this removal action, was designed to protect personnel working under the Radiation Work Permit (RWP) from excessive exposure to both the penetrating radiation and the airborne particulate radiation found in the vicinity of the K-65 Silos. The penetrating radiation dose was determined to be in the range of 50-60 mrem/hr on the K-65 berm near the top of the corrugated pipe to about 0.6 mrem/hr at the inside of the fence to the west of the sump. The highest radiation readings in the area were 150 mrem/hr on contact with the silo domes. Furthermore, Radon from the K-65 Silos was identified as the constituent that exhibited the highest potential for personnel exposure.

An Exclusion Zone was established to demark the area of high potential hazard from radiological or chemical dangers. Access to the Exclusion Zone was restricted to trained and certified employees as required by OSHA 29 CFR 1910.120. Personnel stay-times in the K-65 Area were controlled by radiological safety procedures to ensure that personnel did not exceed the site administrative exposure control level of 150 mrem/week.

Air monitoring, targeted in the breathing zone, assured that contaminant concentrations did not exceed the concentrations specified by allowable exposure levels. The air monitoring program was designed to detect radon and radon progeny. Continuous radon gas monitoring was provided at the K-65 Area fenceline using alpha scintillation devices. Working level grab samples (Table 3), designed to detect radon progeny, were collected by a portable air pump and filter unit (breathing zone monitor). Working level concentrations are exposure concentration estimates for personnel working in the immediate area.

Radiation surveys were conducted at the beginning of the work. Personnel were required to wear direct reading dosimeters and to monitor radiation exposure periodically. Particulate radionuclides from the liquid were prevented from becoming airborne by use of High Efficiency Particulate Air (HEPA)-filtered vents on the receiving tanks. Monitoring was performed to ensure that personnel were not excessively exposed above the allowable weekly dose.

All site personnel were trained in accordance with OSHA 29 CFR 1910.120, as well as, Westinghouse Environmental Management Company of Ohio (WEMCO) and DOE-FN site requirements.

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TABLE 3

RADON GRAB SAMPLE SUMMARY

DATE	LOCATION	WORKING LEVEL	COMMENTS
06/26/91	Decant Sump Manway	0.199	None.
06/26/91	Decant Sump Manway	3.95	None.
06/19/91	Decant Sump Tank Valve	0.0001	Post Sampling Air Check.
06/19/91	Downwind of Decant Sump: Hatch of Tanker Truck	0.0001	Sample taken at hatch of tank truck while pumping.
06/18/91	Weston Road: Hatch of Tanker Truck	0.112	Sample taken at hatch of tank truck while pumping.
06/18/91	Top of Decant Sump Tank	8.87	None.
06/18/91	Weston Road: North of Silo 1	0.075	Downwind of decant sump tank area.
06/18/91	Downwind of Decant Sump: Hatch of Tanker Truck	0.031	Taken within Exclusion Zone while pumping.
06/07/91	Decant Sump Area	0.287	None.
05/14/91	Decant Sump Tank Manway	5.138	None.
04/16/91	Downwind of Decant Sump Manway	0.007	None.
04/16/91	Tanker Hatch: East of Pressure Gauge	0.19	None.
04/16/91	Decant Sump Tank Manway	3.83	None.
04/16/91	Tanker Hatch: West of Silo 1	1.93	None.
04/16/91	Decant Sump Tank Manway	5.36	None.
04/16/91	RGM #2: Tanker Work Area	Not Detected	None.
04/16/91	Left Rear Truck Bumper: Work Area	Not Detected	None.
04/16/91	Van: 25' South of Tanker Work Area	Not Detected	None.
04/16/91	Ledge, Below Vent of Decant Sump	0.014	None.
04/16/91	4' North of Decant Sump Manway	1.62	None.
04/16/91	4' North of Decant Sump Manway	0.082	None.

QUALITY ASSURANCE PLAN

The K-65 Decant Sump Tank Removal Action was conducted in accordance with the requirements of the overall quality assurance program at the FEMP which is described in the site Quality Assurance Plan, FMPC 2139. The Quality Assurance Plan is based on the criteria specified in ASME NQA-1, Federal EPA Guideline QAMS-005/80, and DOE Orders 5700.6 and 5400.1. Specific quality assurance requirements were incorporated into written and approved procedures and into personnel training. Periodic surveillance reports, performed by the FEMP operating contractor, verified that implementation of the K-65 Decant Sump Tank Removal Action complied with the Quality Assurance Plan.

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REGULATORY CONCERNS

The contents of Silos 1 and 2 are exempted from RCRA regulation by the OEPA in 40 CFR 261.4(a)(4), which exclude "by-product" material as defined by the Atomic Energy Act (AEA) of 1954, as amended, 42 USC 2011 et seq. (AEA). The material stored in the K-65 Silos are tailings and/or residues produced by the extraction of uranium (10 CFR 962, 52 FR 15937) and therefore meet the exclusion by definition.

The exclusion, according to 40 CFR 261.4 (a)(4), applies to "...source, special nuclear or "by-product" material as defined in the ...[AEA]...". The AEA defines "by-product" as:

> "...(1) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material, and (2) the tailings or waste produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content" [AEA Section 112(e)].

The material stored in the K-65 Silos is residue resulting from the processing of uranium ore. Under 40 CFR 261.1(a)(4), as applied here, the residues in the K-65 Silos are excluded from regulation under RCRA as the residues resulted from the processing of uranium ores, and are not "... "by-products" from utilizing special nuclear material...". In addition, "by-product" material is expressly excluded from the definition of solid waste under federal law [40 USC 6903(27)].

The residue material present in the decant sump tank is from past decanting operations of the K-65 Silos. During the original placement of the K-65 Silo material, slurried liquid was decanted from the silos into the decant sump tank. K-65 residue in the form of suspended solids, present in this decanted liquid, settled to form the residue material in the decant sump tank. Approximately 300 gallons of this residue material, originating from K-65 Silo decanting operations, currently remains in the decant sump tank. This residue, a "by-product" material by definition, is excluded from RCRA. Any liquid which accumulates in the tank is therefore mixed with this "by-product" material, and is itself excluded from RCRA. This interpretation is consistent with EPA guidance for residual water and runoff from coal ash which is also excluded from regulation in 40 CFR 261.4. The sentiment indicated by this guidance is that residuals generated from an excluded material can themselves be excluded.

The K-65 decant sump tank is still connected to an active underdrain system located below the K-65 Silos. Although this tank served to receive decant water from the residues slurried into Silo 1 and 2 (K-65 Silos) during the Silos' operational period, a secondary function of the tank was to contain any liquids collected below the base of these silos by the underdrain system. The decant sump tank continues today to act as a means to manage rainwater infiltration of subsoils beneath the silo base.

In conclusion, the rainwater infiltration into the tank is contaminated by K-65 residue sludge, a "by-product" material that is currently in the decant sump tank, and is therefore excluded from regulations under RCRA according to 40 CFR 261.4 (a)(4).

To support waste management activities, a list of potential ARARs (Attachment C) for the removal action was developed because the material exhibited the potential for heavy metals in quantities in excess of RCRA levels. Meeting the FEMP wastewater pre-treatment standards (e.g. volatile organic or semi-volatile organic constituents below levels of regulatory concern), the liquid was treated in the existing FEMP wastewater treatment facilities using approved treatment procedures for heavy metals and radionuclides. The NPDES regulatory requirements for FEMP wastewater discharge were met by the proper storage, treatment, and disposal activities performed in accordance with the requirements of CERCLA and DOE orders and procedures.

To fulfill the requirements of the National Environmental Policy Act (NEPA), a categorical exclusion (CATEX) determination was generated and approved by DOE-Headquarters (DOE-HQ). The CATEX was prepared in accordance with the September 7, 1990, Section D Amendment to the NEPA. Under this September 1990 amendment, removal actions under CERCLA do not require Environmental Assessments or Environmental Impact Statements. Prior to generating the Categorical Exclusion Determination, it was determined that this project did not threaten a violation of applicable statutory, regulatory, or permit requirements and that it would not affect "environmentally sensitive areas".

FUTURE ACTIVITIES

The decant sump tank itself is capable of holding 9,000 gallons. The 33-foot. 30-inch diameter corrugated, galvanized steel pipe, welded onto the top manway access of the decant sump tank prior to placement of the earthen berm around the silos, and the associated piping of the underdrain system is estimated to hold at least 1,000 gallons. From observation of the presence of standing liquid in the access pipe prior to implementation of the removal action, it is logical to assume that the tank and access pipe system are essentially intact and capable of holding 10,000+ gallons.

The K-65 Decant Sump Tank Removal Action was originally initiated to reduce the risk associated with decant sump tank liquid release during the K-65 slant boring activities required in the K-65 decant sump tank area. This sampling program revealed that high concentrations of the major constituents of the K-65 residues (i.e. Th-230, Ra-226, Pb-210) were not evident in the perched groundwater near the decant sump tank. In addition, periodic measurements of the tank's water level have revealed that the water level is increasing, most likely due to the infiltration of rainwater into the underdrain system. Both of these facts support the hypothesis that leakage from the tank is minimal.

Being an "active system", the decant sump tank is expected to collect liquid as it has in the past and will continue to in the future. Future planned work activities focus on the monitoring of the level of liquid in the K-65 decant sump tank.

Based on best engineering judgement, the point at which further pumping of the liquid from the decant sump tank should be initiated to prevent release of the liquid into the environment has been estimated to be in the order of 75 to 80% of the 9,000-gallon tank capacity. This target level allows for time to implement the maintenance activity of pumping the tank (it would not be sensible to wait until the tank reached its full capacity before implementing the maintenance activity due to the possibility of unforeseen delays). Future pumping at the 75 to 80% tank capacity also makes sense from an As Low As Reasonably Achievable (ALARA) standpoint. More frequent pumping would create unnecessary risk from the repeated exposures associated with the handling and processing of small batches of liquids.

Routine decant sump liquid level measurements have been made by the FEMP since the removal action was completed. Rainwater infiltration into the decant sump system is expected to occur slowly over time. The sump level had increased a total of 33.8 inches from June of 1991 to August of 1992; with a 27.8 inch increase between February and August of 1992. Between June 1991 and December 1992, measurements indicated that the water in the decant sump tank increased a total of 72.9 inches.

In December 1992, the level in the tank was calculated to be within the 70 to 80% target range. A planned maintenance operation was implemented to remove the liquid in the decant sump tank in accordance with the procedures outlined in the K-65 Decant Sump Tank RAWP. The removed liquid was then managed in accordance with the existing procedures and ARARs as outlined in the RAWP.

Consistent with the goals of OU4 Final Remediation, periodic maintenance pumping actions will mitigate the threat of overfilling the decant sump tank and the potential release of liquid to the surrounding environment. Periodic monitoring will be performed until final remediation of the system is implemented. As the liquid in the decant sump tank again approaches 75 to 80% of the tank's capacity, periodic maintenance pumping activities are planned and will be implemented in accordance with the procedures outlined in the K-65 Decant Sump Tank RAWP. Also, if an abnormal event (i.e. a sudden drop in liquid level which would indicate a loss of tank integrity) occurs, an immediate evaluation would be made to determine whether pumping of the remaining liquid should be implemented.

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CONCLUSION

The K-65 Decant Sump Tank Removal Action successfully implemented an action to protect human health and the environment by mitigating the threat of a potential release of radiologically contaminated liquid to the subsoil in the area adjacent to the FEMP K-65 Silos. The K-65 Decant Sump Tank Removal Action followed an approved work plan that outlined the planning and design requirements, the removal action implementation, the sampling analysis requirements, the health and safety procedures, and the quality assurance objectives. The decant sump tank, associated equipment, and any residues will be dispositioned as part of the final remediation of OU4.

In December 1992, the level in the tank was calculated to be within the 70 to 80% target range for repumping. A planned maintenance operation was implemented to remove the liquid in the decant sump tank in accordance with the procedures outlined in the K-65 Decant Sump Tank RAWP.

Because the liquid level in the decant sump tank is expected to be steadily increasing, post-removal action monitoring of the liquid level is required as a best management practices (BMP) action until final remediation is initiated. Future removal of the liquid in the K-65 decant sump tank may still be required based on the monitoring results. If the tank again approaches a full condition, defined as 75 to 80% capacity, prior to remediation, or, if an abnormal condition in tank level is observed, an evaluation of the condition will be made, and a recommendation will be forwarded to DOE-FN to authorize implementing any recommended actions.

REFERENCES

A copy of each document associated with the K-65 Decant Sump Tank Removal Action has been compiled and placed in the FEMP Administrative Record, under the title, "Removal Action #5 - Decant Sump Tank". A copy of Removal Action #5 index for the Administrative Record is included as Attachment D.

ATTACHMENT A

PRELIMINARY ANALYTICAL RESULTS

K-65 DECANT SUMP TANK REMOVAL ACTION

RADIOLOGICAL QUALIFIERS

D = Denotes possible false negative, i.e., the reported non-positive value is greater than the CRDL.

C = Denotes calculated total uranium value from uranium isotopic results does not agree within 20% of the reported uranium results.

E = Denotes calculated enrichment of uranium 235 outside of acceptance limits.

F = Denotes calculated uranium 234/uranium 235 ratio is outside of acceptance limits.

J = Denotes analyte present, reported value may not be accurate or precise.

M = Denotes matrix spike recovery out of bounded limit.

R = Denotes that the results are unusable.

INORGANIC QUALIFIERS

U = Analyte was analyzed for but not detected.

J = Indicates an estimated value.

B = Reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the instrument Detection Limit (IDL).

E = The reported value is estimated because of the presence of interference.

N = Spiked sample recovery not within control limits.

S = The reported value was determined by the Method of Standard Additions.

W = Post-digestion spike for Furnace AA analysis in not out of control limits (85-110%), while sample absorbance is less than 50% of spike absorbance.

X = Detection limit is higher than normal due to sample matrix interferences.

* = Duplicate analysis not within control limits.

R = Denotes that the results are unusable.

ORGANIC QUALIFIERS

U = Indicates compound was analyzed for but not detected. The sample quantitation limit must be corrected for dilution and for percent moisture.

J = Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds were a 1:1 response is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero.

B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

E = This flag identifies compounds whose concentrations exceed the calibration range for the GC/MS instrument for that specific analysis.

D = This flag identifies all compounds identified in an analysis at a secondary dilution factor.

F = Estimated value due to a confirmed compound which is off-scale in both columns.

X = A flag that FORMASTER III CLP software automatically inserts to indicate that the data was entered manually.

* = Values outside of contract required QC limits.

R = Denotes that the results are unusable.

U.S. EPA - CLP

3
BLANKS

Lab Name: IT_OAK_RIDGI_____ Contract: FERNALD___

Lab Code: ITNWL_ Case No.: 16377 SAS No.: _____ SDG No.: 99403_

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	60.0	U	60.0	U	60.0	U	60.0	U	60.0	U	P
Antimony	30.0	U	30.0	U	30.0	U	30.0	U	30.0	U	P
Arsenic	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U	P
Barium	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	P
Beryllium	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	P
Cadmium	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	P
Calcium	20.0	U	20.0	U	20.0	U	20.0	U	20.0	U	P
Chromium	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	P
Cobalt	30.0	U	-14.7	B	-18.9	B	-27.3	B	-10.5	B	P
Copper	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	P
Iron	30.0	U	10.0	U	10.0	U	10.0	U	10.0	U	P
Lead	40.0	U	40.0	U	40.0	U	40.0	U	40.0	U	P
Magnesium	30.0	U	50.0	U	50.0	U	50.0	U	30.0	U	P
Manganese	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	P
Mercury	0.2	U	0.2	U					0.2	U	CV
Nickel	40.0	U	40.0	U	40.0	U	40.0	U	40.0	U	P
Potassium	100.0	U	100.0	U	100.0	U	100.0	U	100.0	U	AA
Selenium	80.0	U	80.0	U	80.0	U	80.0	U	80.0	U	AA
Silver	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	P
Sodium	100.0	U	100.0	U	100.0	U	100.0	U	100.0	U	P
Thallium	2.0	U	2.0	U	2.0	U			2.0	U	P
Vanadium	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	P
Zinc	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	P
Cyanide	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	AS

PRELIMINARY

U.S. EPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99403

Lab Name: CC_OAK_RIDGE_____ Contract: FERNALD___

Lab Code: CCONL_ Case No.: 36377 SAS No.: _____ SDG No.: 99403_

Matrix (soil/water): WATER Lab Sample ID: FF 2543___

Level (low/med): _____ Date Received: 11/01/90

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	36200			P
7440-36-0	Antimony	189			P
7440-38-2	Arsenic	855			P
7440-39-3	Barium	683			P
7440-41-7	Beryllium	1.6			P
7440-43-9	Cadmium	28.4			P
7440-70-2	Calcium	136000			P
7440-47-3	Chromium	417			P
7440-48-4	Cobalt	1660			P
7440-50-8	Copper	887			P
7439-89-6	Iron	70100			P
7439-92-1	Lead	39000			P
7439-95-4	Magnesium	37200			P
7439-96-5	Manganese	1620			P
7439-97-6	Mercury	0.20	U		CV
7440-02-0	Nickel	2330			P
7440-09-7	Potassium	18000			AV
7782-49-2	Selenium	8530			P
7440-22-4	Silver	182			P
7440-23-5	Sodium	100	U		P
7440-28-0	Thallium	2.0	U		P
7440-62-2	Vanadium	311			P
7440-66-6	Zinc	11500			P
	Cyanide	462			AS

Color Before: GREEN____ Clarity Before: OPAQUE Texture: N/A___

Color After: YELLOW___ Clarity After: CLEAR_ Artifacts: YES___

Comments:

GRASS AND BUGS WERE PRESENT IN SAMPLE. SAMPLE WAS FLUORESCENT GREEN. FF 2542 FOR HG IS THE SAME AS FF 2543. FF 2541 FOR CN IS THE SAME AS FF 2543.

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[illegible]-MN098R01 Page __ of __

WET CHEMISTRY

PROJECT CODE: ADV 36577 DATE RECEIVED: 11/01/90

SAMPLE DESCRIPTION: K-65 Decant Tank CONCENTRATION UNITS: mg/L

CLIENT #:	99403				
SAMPLE #:					
NH_3, TKN, PO_4	FF2549				
Cl, Fl, SO_4	FF2548				
NO_3/ PHENOL	FF2545/FF2544				
SULFIDE	FF2546				
TOC	FF2547				
TOX	FF2550				

RESULTS

	Prep Date	Anal Date	BLANK	99403		
AMMONIA	11/08/90	11/08/90	0.10 U	12.6		
TKN	__/__/__	11/09/90				
TL. PHOS.	11/14/90	11/14/90	0.02 U	8.13		
CHLORIDE	11/09/90	11/09/90	0.50 U	90.9		
FLUORIDE	11/14/90	11/14/90	0.10 U	18.7		
SULFATE	11/12/90	11/12/90	2.00 U	[illegible]		
NITRATE	11/07/90	11/07/90	0.10 U	581		
PHENOL	11/06/90	11/06/90	0.01 U	0.02		
SULFIDE	11/05/90	11/05/90	0.5 U	0.5 U		
TOC	11/07/90	11/07/90	1.00 U	108		
TOX	11/08/90	11/08/90	0.010 U	0.255		

REVIEWED BY: ______________________ REVIEWED BY: ______________________

1F

EPA SAMPLE N

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

99403R

Lab Name: [illegible]-OAK RIDGE Contract: [illegible]

Lab Code: [illegible]-MWL Case No.: 16377 SAS No.: NA SDG No.: 99403

Matrix: (soil/water) WATER Lab Sample ID: [illegible]

Sample wt/vol: 1000 (g/mL) ML Lab File ID: [illegible]

Level: (low/med) LOW Date Received: 11/01/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/15/90

Extraction: (Sepf/Cont/Sonc) SEPF Date Analyzed: 11/19/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 4

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	126-73-8	PHOSPHORIC ACID TRIBUTYL EST	17.44	140	J
2.	85591-17-8	5-INDACENE-1,7-DIONE, 2,3,5,	24.05	11	J
3.		UNKNOWN	19.10	6.2	J
4.	62108-27-4	DECANE, 2,4,6-TRIMETHYL-	10.67	4.6	J

1/87

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

0000
EPA SAMPLE NO.

99402

Lab Name: [illegible] Contract: ADV

Lab Code: [illegible] Case No.: 16161 SAS No.: NA SDG No.: 99402

Matrix: (soil/water) WATER Lab Sample ID: [illegible]

Sample wt/vol: [illegible] (g/ML) ML Lab File ID: [illegible]

Level: (low/med) LOW Date Received: 10/25/90

% Moisture: not dec. [illegible] Date Analyzed: 10/29/90

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	6	B
67-64-1	Acetone	16	B
75-15-0	Carbon Disulfide	2	J
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	12	B
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	11	
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

11-1-90

00006

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

99402

Lab Name: [illegible] Contract: [illegible]

Lab Code: [illegible] Case No.: [illegible] SAS No.: NA SDG No.: 99402

Matrix: (soil/water) WATER Lab Sample ID: [illegible]

Sample wt/vol: [illegible] (g/mL) ML Lab File ID: [illegible]

Level: (low/med) LOW Date Received: 10/2?/90

% Moisture: not dec. ___ Date Analyzed: 10/29/90

Column (pack/cap) PACK Dilution Factor: [illegible]

CONCENTRATION UNITS:

Number TICs found: 2 (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	10.10	40	J
2.	UNKNOWN	17.80	11	J

PRELIMINARY

[illegible] 11-14-90

00077

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE N

VBLKB1

Lab Name: [illegible]-OAK RIDGE Contract: ACV

Lab Code: [illegible] Case No.: 15151 SAS No.: SDG No.: 99402

Matrix: (soil/water) WATER Lab Sample ID: VBBK1029

Sample wt/vol: [illegible] (g/ml) ML Lab File ID: VBB1029

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 10/29/90

Column: (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	3	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	2	J
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	5	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

00078

EPA SAMPLE NO

VBLKB1

1Z
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: [illegible] Contract: ARY

Lab Code: [illegible] Case No.: 16161 SAS No.: [illegible] SDG No.: 99402

Matrix: (soil/water) WATER Lab Sample ID: VBBI029

Sample wt/vol: [illegible] (g/ML) ML Lab File ID: VBBI029

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 10/29/90

Column (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

PRELIMINARY

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1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

PBLK1

Lab Name: STAS-KNOXVILLE Contract: FERNALD

Lab Code: ST-KNX Case No.: 16377 SAS No.: NA SDG No.: 99403

Matrix: (soil/water) WATER Lab Sample ID: Q2034

Sample wt/vol: 1000 (G/mL) ML Lab File ID:

Level: (low/med) LOW Date Received: NA

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/16/90

Extraction: (Sepf/Cont/Sonc) SEPF Date Analyzed: 11/19/90

GPC Cleanup: (Y/N) N pH: NO Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
5103-71-9	alpha-Chlordane	0.50	U
5103-74-2	gamma-Chlordane	0.50	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.50	U
11104-28-2	Aroclor-1221	0.50	U
11141-16-5	Aroclor-1232	0.50	U
53469-21-9	Aroclor-1242	0.50	U
12672-29-6	Aroclor-1248	0.50	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

99403

Lab Name: STL-KNOXVILLE Contract: FERNALD

Lab Code: ST-KNX Case No.: 36377 SAS No.: NA SDG No.: 99403

Matrix: (soil/water): WATER Lab Sample ID: FP2552

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

Level: (low/med) LOW Date Received: 11/01/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/15/90

Extraction: (Sepf/Cont/Sonc) SEPF Date Analyzed: 11/19/90

GPC Cleanup: (Y/N) N pH: 6.0 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.10	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.50	U
72-43-5	Methoxychlor	0.10	U
53494-70-5	Endrin ketone	0.50	U
5103-71-9	alpha-Chlordane	0.50	U
5103-74-2	gamma-Chlordane	1.0	U
8001-35-2	Toxaphene	0.50	U
12674-11-2	Aroclor-1016	0.50	U
11104-28-2	Aroclor-1221	0.50	U
11141-16-5	Aroclor-1232	0.22	J
53469-21-9	Aroclor-1242	0.50	U
12672-29-6	Aroclor-1248	0.081	J
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260		

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NOV 21 '90 10:21 ... FERNALD ... 11-21-90 10:22PM ... FERNALD
SENT BY: IT CORP CTL

EPA SAMPLE NO.

SBLKB2

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: ITAS-OAK RIDGE Contract: ANL

Lab Code: IT-MWL Case No.: 16377 SAS No.: NA SDG No.: 99402

Matrix: (soil/water) WATER Lab Sample ID: 02031

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 02031B

Level: (low/med) LOW Date Received: ______

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/15/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/19/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	CONCENTRATION	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

.OV 21 '90 12:[illegible] 				.11-21-90 12:19PM 				[illegible]

SENT BY: [illegible]

1B

EPA SAMPLE NO

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SBLKB2

Lab Name: [illegible]-OAK RIDGE 		Contract: [illegible]

Lab Code: [illegible] 		Case No.: [illegible] 		SAS No.: NA 		SDG No.: 99403

Matrix: (soil/water) WATER 		Lab Sample ID: 02021

Sample wt/vol: 1000 (g/mL) ML 		Lab File ID: 02021R

Level: (low/med) LOW 		Date Received: ______

% Moisture: not dec. ______ dec. ______ 		Date Extracted: 11/[illegible]/90

Extraction: (SepF/Cont/Sonc) SEPF 		Date Analyzed: 11/19/90

GPC Cleanup: (Y/N) N 		pH: ______ 		Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	1	U
88-74-4	2-Nitroaniline	5	U
131-11-3	Dimethyl Phthalate	1	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1/87 R

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1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

SBLKB1

Lab Name: [illegible]-OAK RIDGE Contract: ADV

Lab Code: [illegible]-MWL Case No.: [illegible] SAS No.: NA SDG No.: 99403

Matrix: (soil/water) WATER Lab Sample ID: 92007

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 92007

Level: (low/med) LOW Date Received: ____

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/09/90

Extraction: (Sepf/Cont/Sonc) SEPF Date Analyzed: 11/19/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.: SBLKB1

Lab Name: ERIS-OAK RIDGE Contract: ADV

Lab Code: ERWL Case No.: 16377 SAS No.: NA SDG No.: 99402

Matrix: (soil/water) WATER Lab Sample ID: 92097

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 92097

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ dec. _____ Date Extracted: 11/05/90

Extraction: (Sepf/Cont/Sonc) SEPF Date Analyzed: 11/19/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	50	U
65-85-0	Benzoic Acid	10	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	50	U
95-95-4	2,4,5-Trichlorophenol	10	U
91-58-7	2-Chloronaphthalene	50	U
88-74-4	2-Nitroaniline	10	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
99403R

Lab Name: [illegible]-OAK RIDGE Contract: ADV

Lab Code: [illegible]-MWL Case No.: [illegible] SAS No.: NA SDG No.: 99403

Matrix: (soil/water) WATER Lab Sample ID: [illegible]

Sample wt/vol: 1000 (g/mL) ML Lab File ID: [illegible]

Level: (low/med) LOW Date Received: 11/01/90

% Moisture: not dec. ____ dec. ____ Date Extracted: [illegible]/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: [illegible]/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	10	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	50	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	10	U
85-01-8	Phenanthrene	50	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)Anthracene	20	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

99403R

Lab Name: ERAS-OAK RIDGE Contract: ADV

Lab Code: ERAS Case No.: 16177 SAS No.: NA SDG No.: 99403

Matrix: (soil/water) WATER Lab Sample ID: FF2587

Sample wt/vol: 1000 (g/mL) ML Lab File ID: FF2587R

Level: (low/med) LOW Date Received: 11/01/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/08/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/09/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	50	U
95-95-4	2,4,5-Trichlorophenol	10	U
91-58-7	2-Chloronaphthalene	50	U
88-74-4	2-Nitroaniline	10	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene		

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

99403

Lab Name: ITAS-OAK RIDGE Contract: ADV

Lab Code: IT-WWL Case No.: 16277 SAS No.: NA SDG No.: 99403

Matrix: (soil/water) WATER Lab Sample ID: FF2552

Sample wt/vol: 500 (g/mL) ML Lab File ID: FF2552

Level: (low/med) LOW Date Received: 11/01/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/05/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/19/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	Q
		100 U
99-09-2	3-Nitroaniline	20 U
83-32-9	Acenaphthene	100 U
51-28-5	2,4-Dinitrophenol	100 U
100-02-7	4-Nitrophenol	20 U
132-64-9	Dibenzofuran	20 U
121-14-2	2,4-Dinitrotoluene	20 U
84-66-2	Diethylphthalate	20 U
7005-72-3	4-Chlorophenyl-phenylether	20 U
86-73-7	Fluorene	100 U
100-01-6	4-Nitroaniline	100 U
534-52-1	4,6-Dinitro-2-Methylphenol	20 U
86-30-6	N-Nitrosodiphenylamine (1)	20 U
101-55-3	4-Bromophenyl-phenylether	20 U
118-74-1	Hexachlorobenzene	100 U
87-86-5	Pentachlorophenol	20 U
85-01-8	Phenanthrene	20 U
120-12-7	Anthracene	20 U
84-74-2	Di-n-Butylphthalate	20 U
206-44-0	Fluoranthene	20 U
129-00-0	Pyrene	20 U
85-68-7	Butylbenzylphthalate	40 U
91-94-1	3,3'-Dichlorobenzidine	20 U
56-55-3	Benzo(a)Anthracene	20 U
218-01-9	Chrysene	20 U
117-81-7	bis(2-Ethylhexyl) Phthalate	20 U
117-84-0	Di-n-Octyl Phthalate	20 U
205-99-2	Benzo(b)Fluoranthene	20 U
207-08-9	Benzo(k)Fluoranthene	20 U
50-32-8	Benzo(a)Pyrene	20 U
193-39-5	Indeno(1,2,3-cd)Pyrene	20 U
53-70-3	Dibenz(a,h)Anthracene	20 U
191-24-2	Benzo(g,h,i)Perylene	20 U

(1) - Cannot be separated from Diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

99403

Lab Name: MMES-OAK RIDGE Contract: ADV

Lab Code: MMES Case No.: 16377 SAS No.: NA SDG No.: 99403

Matrix: (soil/water) WATER Lab Sample ID: FF2582

Sample wt/vol: 500 (g/mL) ML Lab File ID: FF2582

Level: (low/med) LOW Date Received: 11/01/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/05/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/19/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-95-2	Phenol	20	U
111-44-4	bis(2-Chloroethyl)Ether	20	U
95-57-8	2-Chlorophenol	20	U
541-73-1	1,3-Dichlorobenzene	20	U
106-46-7	1,4-Dichlorobenzene	20	U
100-51-6	Benzyl Alcohol	20	U
95-50-1	1,2-Dichlorobenzene	20	U
95-48-7	2-Methylphenol	20	U
108-60-1	bis(2-Chloroisopropyl)Ether	20	U
106-44-5	4-Methylphenol	20	U
621-64-7	N-Nitroso-Di-n-Propylamine	20	U
67-72-1	Hexachloroethane	20	U
98-95-3	Nitrobenzene	20	U
78-59-1	Isophorone	20	U
88-75-5	2-Nitrophenol	20	U
105-67-9	2,4-Dimethylphenol	20	U
65-85-0	Benzoic Acid	4	U
111-91-1	bis(2-Chloroethoxy)Methane	20	U
120-83-2	2,4-Dichlorophenol	20	U
120-82-1	1,2,4-Trichlorobenzene	20	U
91-20-3	Napnthalene	20	U
106-47-8	4-Chloroaniline	20	U
87-68-3	Hexachlorobutadiene	20	U
59-50-7	4-Chloro-3-Methylphenol	20	U
91-57-6	2-Methylnapnthalene	20	U
77-47-4	Hexachlorocyclopentadiene	20	U
88-06-2	2,4,6-Trichlorophenol	100	U
95-95-4	2,4,5-Trichlorophenol	20	U
91-58-7	2-Chloronapthalene	100	U
88-74-4	2-Nitroaniline	20	U
131-11-3	Dimethyl Phthalate	20	U
208-96-8	Acenaphthylene	20	U
606-20-2	2,6-Dinitrotoluene	20	U

ATTACHMENT B

FINAL ANALYTICAL RESULTS

K-65 DECANT SUMP TANK REMOVAL ACTION

Radiological Validation Qualifiers for OU4 (Revision 1) - 08/04/92

SAMPLE	SUFFIX	RADIONUCLIDE	RESULTS	2-SIGMA	UNITS	Q5
099411		CS-137	< 20		pCi/l	R
099411		NP-237	< 1.0		pCi/l	R
099411		PU-238	< 1.0		pCi/l	J
099411		PU-239/240	< 1.0		pCi/l	-
099411		RA-226	836	± 118	pCi/l	R
099411		RA-228	< 3.0		pCi/l	R
099411		RU-106	< 150		pCi/l	R
099411		SR-90	< 5.0		pCi/l	R
099411		TC-99	< 30.0		pCi/l	J
099411		TH-228	< 1.0		pCi/l	-
099411		TH-230	< 1.0		pCi/l	R
099411		TH-232	< 1.0		pCi/l	-
099411		TH-TOTAL	< 7.1		ug/l	D
099411		U-235	1310	± 170	pCi/l	-
099411		U-238	26000	± 2800	pCi/l	-
099411		U-TOTAL	77400	± 11500	ug/l	J

Radiological Validation Qualifiers for OU4 (Revision 1) - 08/04/92

SAMPLE	SUFFIX	RADIONUCLIDE	RESULTS	2-SIGMA	UNITS	Q5
099412		CS-137	< 20		pCi/l	R
099412		NP-237	1.2	± 0.8	pCi/l	-
099412		PU-238	< 1.0		pCi/l	J
099412		PU-239/240	< 1.0		pCi/l	-
099412		RA-226	1120	± 158	pCi/l	J
099412		RA-228	4.81	± 1.11	pCi/l	J
099412		RU-106	< 150		pCi/l	R
099412		SR-90	< 5.0		pCi/l	-
099412		TC-99	< 30.0		pCi/l	-
099412		U-235	1362	± 187	pCi/l	R
099412		U-238	22490	± 4269	pCi/l	R
099412		U-TOTAL	75000	± 11400	ug/l	J

Radiological Validation Qualifiers for OU4 (Revision 1) - 08/04/92

4149

SAMPLE	SUFFIX	RADIONUCLIDE	RESULTS	2-SIGMA	UNITS	Q5
099415		CS-137	< 20		pCi/l	J
099415		NP-237	< 1.0		pCi/l	R
099415		PU-238	< 1.0		pCi/l	R
099415		PU-239/240	< 1.0		pCi/l	J
099415		RA-226	797	± 113	pCi/l	R
099415		RA-228	< 3.0		pCi/l	-
099415		RU-106	< 150		pCi/l	J
099415		SR-90	6.47	± 1.35	pCi/l	J
099415		TC-99	43.8	± 20.7	pCi/l	-
099415		TH-228	2.72	± 1.53	pCi/l	R
099415		TH-230	197	± 27	pCi/l	R
099415		TH-232	< 1.8		pCi/l	J
099415		TH-TOTAL	< 16		ug/l	J
099415		U-235	1074	± 111	pCi/l	J
099415		U-238	20390	± 2110	pCi/l	J
099415		U-TOTAL	70400	± 11000	ug/l	R

Radiological Validation Qualifiers for OU4 (Revision 1) - 08/04/92

SAMPLE	SUFFIX	RADIONUCLIDE	RESULTS	2-SIGMA	UNITS	Q5
099416		AC-227	< 91.1		pCi/l	-
099416		PA-231	< 431		pCi/l	J
099416		PB-210	8660	± 866	pCi/l	J
099416		PO-210	7080	± 930	pCi/l	-
099416		RA-224 (GAMMA)	< 27		pCi/l	J
099416		RA-226	1640	± 230	pCi/l	J
099416		RA-226 (GAMMA)	973	± 81	pCi/l	R
099416		RA-228	8.80	± 1.56	pCi/l	J
099416		RA-228 (GAMMA)	< 76		pCi/l	DJ

Radiological Validation Qualifiers for OU4 (Revision 1) - 08/04/92

SAMPLE	SUFFIX	RADIONUCLIDE	RESULTS	2-SIGMA	UNITS	Q5
099417		AC-227	5783	± 603	pCi/g	J
099417		PA-231	< 855		pCi/g	DJ
099417		PB-210	123200	± 12330	pCi/g	J
099417		RA-224	< 41		pCi/g	J
099417		RA-226	128500	± 6440	pCi/g	J
099417		RA-228	< 140		pCi/g	DJ
099417		TH-230	52130	± 7582	pCi/g	J
099417		U-TOTAL	< 1255		ug/g	DJ

Radiological Validation Qualifiers for OU4 (Revision 1) - 08/04/92

SAMPLE	SUFFIX	RADIONUCLIDE	RESULTS	2-SIGMA	UNITS	Q5
099420		AC-227	< 2.2		pCi/l	-
099420		PA-231	< 506		pCi/l	DJ
099420		PB-210	2650	± 270	pCi/l	J
099420		PO-210	2490	± 350	pCi/l	J
099420		RA-224	< 33		pCi/l	J
099420		RA-226	481.0	± 68.0	pCi/l	J
099420		RA-226 (GAMMA)	782	± 72	pCi/l	J
099420		RA-228	< 3.0		pCi/l	J
099420		RA-228 (GAMMA)	< 57		pCi/l	DJ
099420		TH-228	< 2.4		pCi/l	DJ
099420		TH-230	16.5	± 4.3	pCi/l	J
099420		TH-232	< 1.0		pCi/l	-
099420		TH-TOTAL	< 5.3		ug/l	D

ATTACHMENT C

POTENTIAL ARARs

K-65 DECANT SUMP TANK REMOVAL ACTION

FEED MATERIALS PRODUCTION CENTER

POTENTIAL ARARs

K-65 DECANT SUMP TANK REMOVAL ACTION

Chemical, Location, or Action	Citation	ARAR/TBC	Rationale for Implementation	Compliance Strategy
Radionuclide Emmissions (except Radon)	40 CFR 61, Subpart H Emissions of radionuclides to the ambient air from DOE facilities shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/yr.	Applicable	Plant 8 stack (equipped with a continous sampler) could contribute to to the dose to members of the public from the air pathway (NESHAPS).	NESHAP compliance for Plant 8 stack is documented in the FMPC sitewide U.S. EPA approved NESHAP document.
Radiation Doses, Levels and Concentrations in Restricted and Unrestricted Areas.	10 CFR 20.101-105 Radiation doses, levels and concentrations for restricted and unrestricted areas shall not exceed specified limits.	Relevant and Appropriate	Radioactive materials from this Removal Action could contribute radiation doses, levels, and concentrations to individuals in restricted and unrestricted areas, which could exceed the specified limits.	Protective measures will be implemented in accordance with the task specific Health and Safety Plan for the K-65 Decant Sump Tank Removal Action.
Treatment, Storage, and Handling	40 CFR 264, General Standards	Relevant and Appropriate	The liquid removed from the K-65 decant sump tank must be handled, stored, and inspected with the liquid removed being managed as a hazardous waste.	
	•40 CFR 264.13 (Waste Analysis) - Operators of a facility must obtain a detailed chemical and physical analysis of a representative sample of each hazardous waste to be treated, stored, or disposed of at the facility prior to treatment, storage, or disposal.	Relevant and Appropriate		As outlined in the Removal Action Work Plan, samples will be taken prior to the liquid being transferred to the tanks in Plant 2/3. Samples will analyzed for HSLs.

FEED MATERIALS PRODUCTION CENTER

POTENTIAL ARARs

K-65 DECANT SUMP TANK REMOVAL ACTION

Chemical, Location, or Action	Citation	ARAR/TBC	Rationale for Implementation	Compliance Strategy
	•40 CFR 264.14 (Security) operators of a facility must prevent the unknowing or unauthorized entry of persons or livestock into the active portion of the facility, maintain a 24-hour surveillance system, or surround the facility with a controlled access barrier and maintain appropriate warning signs at facility approaches.	Relevant and Appropriate		In addition to the FMPC sitewide security measures, the specific access control measures for the K-65 Decant Sump Tank Removal Action are outlined in the task specific Health and Safety Plan, section 6.1.
	•40 CFR 264.15 (Inspections) Operators of a facility must develop a schedule and regularly inspect monitoring equipment, safety and emergency equipment, security devices and operating and structural equipment that are important to preventing, detecting or responding to environmental or human health hazards, promptly or immediately remedy defects, and maintain an inspection log.	Relevant and Appropriate		Inspections of Plant 2/3 storage area and the FMPC water treatment facilities will be in accordance with the FMPC Waste Management Plan, the Waste Analysis Plan, and Standard Operating Procedures.

FEED MATERIALS PRODUCTION CENTER

POTENTIAL ARARs

K-65 DECANT SUMP TANK REMOVAL ACTION

Chemical, Location, or Action	Citation	ARAR/TBC	Rationale for Implementation	Compliance Strategy
	•40 CFR 264.16 (Training) Operator must train personnel within 6 months of their assuming duties at a facility in hazardous waste management procedures relevant to their positions including emergency response training.	Relevant and Appropriate		All FMPC personnel are trained in accordance with 29 CFR 1910.120. Personnel involved with this Removal Action will be trained on the applicable operating procedures and K-65 Emergency Procedure.
Discharge of Treatment System Effluent	40 CFR 122.41 (i) OAC 3745-33-05 <u>Monitoring requirements</u> Discharges must be monitored to assure compliance. Discharges will be monitored for: -the mass of each pollutant -the volume of each pollutant -frequency of discharge and other measurements as appropriate.	Applicable	Required of all direct discharges to waters of the U.S.. The effluent as a result of the treatment of the liquid removed will be discharged to the Great Miami River.	Effluent from the treatment of liquid removed from the K-65 decant sump tank will be monitored according to the requirements in the FMPC NPDES permit.
	40 CFR 136.1-136.4 Approved test methods must be followed for waste constituents to be monitored. Detailed requirements for analytical procedures and quality controls are provided.	Applicable		Same as above.

FEED MATERIALS PRODUCTION CENTER

POTENTIAL ARARs

K-65 DECANT SUMP TANK REMOVAL ACTION

Chemical, Location, or Action	Citation	ARAR/TBC	Rationale for Implementation	Compliance Strategy
	40 CFR 136.1-136.4 (Cont'd) Sample preservation procedures, container materials, and maximum allowable holding times are prescribed.			
	40 CFR 122.41 (i) Comply with additional substantive conditions such as: -Duty to mitigate any adverse effect of any discharge; and -Proper operation and maintenance of treatment systems.	Applicable		Same as above.
Chemicals in Drinking water	40 CFR 141.12 The following MCLs for organic chemicals are the the maximum levels of a contaminant in water which is delivered to a free flowing outlet of the ultimate user of a public water system: - Chloroform 0.1 mg/l -Ethyl-benzene 0.7 mg/l* -Pentachlorophenol 0.2 mg/l* -PCBs 0.0005 mg/l* -Tetrachloroehtylene 0.005 mg/l*	Relevant and Appropriate	The requirement is not applicable since no public water system is involved. It is relevant and appropriate to protect drinking water from the contaminants listed. These contaminants may mitigate or leach into the underlying aquifer.	The MCLs specified will be met by the use of centralized VOC treatment facility at Plant 8 which was installed as part of the Consent Agreement Removal No. 1.

FEED MATERIALS PRODUCTION CENTER

POTENTIAL ARARs

K-65 DECANT SUMP TANK REMOVAL ACTION

Chemical, Location, or Action	Citation	ARAR/TBC	Rationale for Implementation	Compliance Strategy
Chemicals in Drinking Water	40 CFR 141.12 (Cont'd) -Toluene 2.0 mg/l* -Trichloroethylene 0.005 mg/l* -1,1,1 Trihloroethane.2 mg/l -Xylene 10.0 mg/l* *Proposed	Relevant and Appropriate		
Radiation Dose Limit (Drinking Water pathway)	DOE Order 5400.5, Chapter II, Section 1.a The exposure of members of the public to radiation sources as a consequence of all routine DOE activities shall not cause, in a year, an effective dose equivalent greater than 100 mrem from all exposure pathways.	To Be Considered	The radioactive constituents of the liquid removed from the decant sump tank could contribute to the dose to members of the public from drinking water.	The DCGs established by the referenced DOE Order can not be met with the current FMPC available waste water treatment facilities. The established DCGs will be attained when the AWWT is operational in 1993.

ATTACHMENT D

FEMP ADMINISTRATIVE RECORD INDEX

K-65 DECANT SUMP TANK REMOVAL ACTION

FEMP ADMINISTRATIVE RECORD
REMOVAL ACTION #9 -- DECANT SUMP TANK

Index Number	Document Number	Document Title	Rev. #	Document Date	From / To	# of Pages	Type of Document	Location Number
014-101.1	WMCO:EMT:90-539	REMOVAL SITE EVALUATION ON THE K-65 DECANT SUMP TANK WATER		08/17/90	WMCO DOE-FMPC	8	REPORT	RA #9 FILE
014-101.3		POTENTIAL ARARS K-65 DECANT SUMP TANK REMOVAL ACTION	0	/ /		5	ENCLOSURE	RA #9 FILE
014-205.1	DOE-1784-90	REMOVAL ACTION MEMORANDUM: K-65 DECANT SUMP TANK		08/23/90	DOE-FMPC WMCO	2	LETTER	RA #9 FILE
014-207.1		K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN FEED MATERIALS PRODUCTION CENTER	D	09/01/90	WMCO DOE-ORO	45	WORK PLAN	RA #9 FILE
014-207.2		K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN FEED MATERIALS PRODUCTION CENTER SEPTEMBER 1990		09/01/90	WMCO DOE-ORO	49	WORK PLAN	RA #9 FILE
R-014-207.3		K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN FEED MATERIALS PRODUCTION CENTER DECEMBER 1990		12/01/90	WMCO DOE-ORO	100	WORK PLAN	RA #9 FILE
R-014-207.4		WMCO TECHNICAL RECOMMENDATIONS FOR THE RESPONSE TO U.S. EPA MODIFICATIONS OF THE K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN	0	/ /		7	ENCLOSURE	RA #9 FILE
R-014-207.5	DOE-867-91	K-65 DECANT SUMP TANK REMOVAL ACTION	0	03/01/91	DOE-FMPC USEPA	2	LETTER	RA #9 FILE
R-014-207.6	DOE-76-91	K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN		10/17/90	DOE-FSO EPA	2	LETTER	RA #9 FILE

FEMP ADMINISTRATIVE RECORD
REMOVAL ACTION #9 -- DECANT SUMP TANK

Index Number	Document Number	Document Title	Rev. #	Document Date	From To	# of Pages	Type of Document	Location Number
R-014-1001.1		K-65 DECANT SUMP REMOVAL		04/01/91	OEPA DOE-FMPC	1	LETTER	RA #9 FILE
R-014-1001.2		REMOVAL #5 - DECANT TANK U.S. DOE FERNALD OH6 890 008 976	0	01/10/91	USEPA DOE-FMPC	2	LETTER	RA #9 FILE
R-014-1001.3		COMMENTS K-65 DECANT SUMP TANK REMOVAL W.P.		11/19/90	OEPA DOE-FMPC	1	LETTER	RA #9 FILE
R-014-1001.4		CONDITIONAL APPROVAL K-65 DECANT SUMP REMOVAL WORK PLAN		01/11/91	OEPA DOE-FMPC	2	LETTER	RA #9 FILE
R-014-1001.5		REMOVAL #5 K-65 DECANT TANK U.S. DOE FERNALD OH6 890 008 976		11/13/90	USEPA DOE-FMPC	4	LETTER	RA #9 FILE
R-014-1003.1		THE USDOE ANNOUNCES THE AVAILABILITY FOR PUBLIC REVIEW OF THE ADMINISTRATIVE RECORD FILE FOR THE K-65 DECANT SUMP TANK REMOVAL ACTION AT THE DOE FMPC AT FERNALD, OH		/ /		1	ATTACHMENT	RA #9 FILE
R-014-1007.1		RESPONSE TO THE U.S. EPA COMMENTS K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN		12/11/90	DOE-FMPC USEPA	8	REPORT	RA #9 FILE
R-014-1007.2		RESPONSE TO OHIO EPA COMMENTS K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN		12/11/90	DOE-FMPC OEPA	2	REPORT	RA #9 FILE
R-014-1007.3		THE RESPONSE TO OHIO EPA GENERAL COMMENTS ON THE K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN		/ /		2	LETTER	RA #9 FILE